

1 What is claimed is:

2 1. A method for providing a hierarchical representation of a program, said
3 method operable at least in part within an information processing system,
4 comprising:

5 a. determining an object containment hierarchy (OCH) for a first portion of
6 the program;

7 b. annotating the OCH with a temporal flow hierarchy (TFH) from the
8 program to form an annotated OCH for the program; and

9 c. displaying at least a portion of the annotated OCH in response to a user
10 selection.

11 2. The method of claim 1, wherein steps a and b are performed by a program
12 analysis tool based on structural and functional data of the program.

13 3. The method of claim 2, further comprising, prior to step c, displaying a
14 portion of the OCH in response to a selection of a coding pattern, wherein said
15 tool is a debugger and said user selection is a selection of an object in said first
16 portion of the program related to said OCH.

17 4. The method of claim 3, wherein the OCH comprises at least one of a first
18 group of an object reference hierarchy and a data dependence hierarchy, and
19 step b comprises adding temporal flow information from at least one of a
20 second group of a control flow hierarchy, an invocation hierarchy, an allocation
21 hierarchy, and an object creation hierarchy.

22 5. The method of claim 3, wherein the OCH comprises one of a textual,
23 graphical and aural representation of the first group.

24 6. The method of claim 4, wherein step c comprises opening a scrollable
25 window responsive to user action for displaying said portion of the annotated
26 OCH, and displaying a related portion of source code of the program in a
27 second window.

1 7. The method of claim 2, wherein said tool is one of a group of profiler,
2 debugger, and quality analyzer, and step a further comprises determining the
3 TFH for the first portion of the program.

4 8. An information handling system comprising a processor and a program
5 analysis tool, the program analysis tool comprising plural instructions and
6 said processor being operably configured to execute said plural instructions,
7 wherein said plural instructions comprise:

8 first instructions for determining a program hierarchy for a program based on
9 an output of said tool, wherein the program hierarchy comprises a combination
10 of an object containment hierarchy (OCH) and a temporal flow hierarchy
11 (TFH) of the program; and

12 presentation instructions for presenting at least a portion of the program
13 hierarchy in response to a user input.

14 9. The system of claim 8, wherein the first instructions comprise second
15 instructions for determining the OCH for a first portion of the program and
16 further instructions for annotating the OCH with information from the TFH to
17 form an annotated OCH for presenting as said portion of the program
18 hierarchy.

19 10. The system of claim 9, wherein said tool is a program understanding tool
20 operable for performing the first instructions based on operational data of the
21 program.

22 11. The system of claim 10, wherein said program understanding tool is one of
23 a group of profiler, debugger, and quality analyzer, and the second instructions
24 are further operable for determining the TFH for the first portion of the
25 program.

26 12. The system of claim 10, wherein said program understanding tool is a
27 debugger, the system further comprising instructions for displaying a portion

1 of the OCH in response to a selection of a bug, and the presentation
2 instructions being operably responsive to said user input wherein the user
3 input is a selection of an object in said first portion of the program related to
4 said OCH.

5 13. The system of claim 10, wherein the OCH comprises at least one of a first
6 group of an object reference hierarchy and a data dependence hierarchy, and
7 the second instructions are operable for adding temporal flow information from
8 at least one of a second group of a control flow hierarchy, an invocation
9 hierarchy, an allocation hierarchy, and an object creation hierarchy.

10 14. The system of claim 8, wherein the OCH comprises one of a textual,
11 graphical and aural representation of the first group.

12 15. The system of claim 8, wherein the presentation instructions are operable
13 for opening a scrollable window responsive to user action for displaying said
14 portion of the annotated OCH, and displaying a related portion of source code
15 of the program in a second window.

16 16. A program product in a signal bearing medium executable by a device for
17 presenting a hierarchical representation of a target program, the product
18 comprising: first instructions for determining a program hierarchy for the
19 target program based on an output of said product, wherein the program
20 hierarchy comprises a combination of an object containment hierarchy and a
21 temporal flow hierarchy of the target program; and

22 presentation instructions for operably presenting at least a portion of the
23 program hierarchy in response to a user input.

24 17. The program product of claim 16, wherein the first instructions comprise
25 second instructions for determining the OCH for a first portion of the program
26 and further instructions for annotating the OCH with information from the
27 TFH to form an annotated OCH for said presentation instructions to operably
28 present.

1 18. The program product of claim 17, further comprising a program
2 understanding tool operable for performing the first instructions based on
3 operational data of the program.

4 19. The program product of claim 18, wherein said tool is a static analysis
5 tool, the program product further comprising instructions for displaying a
6 portion of the OCH in response to a selection of a program structure, and the
7 presentation instructions being operably responsive to said user input wherein
8 the user input is a selection of an object in said first portion of the program
9 related to said OCH.

10 20. The program product of claim 19, wherein the OCH comprises at least one
11 of a first group of an object reference hierarchy and a data dependence
12 hierarchy, and the second instructions are operable for adding temporal flow
13 information from at least one of a second group of a control flow hierarchy, an
14 invocation hierarchy, an allocation hierarchy, and an object creation hierarchy.

15 21. The program product of claim 20, wherein the OCH comprises one of a
16 textual, graphical and aural representation of the first group.

17 22. The program product of claim 20, wherein the presentation instructions
18 are operable for opening a scrollable window responsive to user action for
19 displaying said portion of the annotated OCH, and displaying a related portion
20 of source code of the program in a second window.

21 23. The program product of claim 18, wherein said tool is one of a group of
22 profiler, debugger, and quality analyzer, and the second instructions are
23 further operable for determining the TFH for the first portion of the program.

24 24. A program analysis apparatus, operable for determining and presenting a
25 hierarchical representation of a target program, the apparatus comprising
26 program analysis instructions and a processor and memory operably
27 configured to run said instructions, said instructions comprising: first
28 instructions for determining a program hierarchy for the target program based

1 on an output of said product, wherein the program hierarchy comprises a
2 combination of an object containment hierarchy and a temporal flow hierarchy
3 of the target program; and
4 further instructions for presenting at least a portion of the program hierarchy
5 in response to a user input.

6 25. The apparatus of claim 24, wherein the first instructions comprise second
7 instructions for determining the OCH for a first portion of the program and
8 third instructions for annotating the OCH with information from the TFH to
9 form an annotated OCH for presenting as said portion of the program
10 hierarchy, the first instructions being further part of a program analysis
11 software tool operable for performing the first instructions based on
12 operational data of the program.

13 26. The apparatus of claim 25, wherein said tool is a profiler, the apparatus
14 further comprising instructions for displaying a portion of the OCH in
15 response to a selection of a program structure, and the presentation
16 instructions being operably responsive to said user input wherein the user
17 input is a selection of an object in said first portion of the program related to
18 said OCH; and wherein the OCH comprises at least one of a first group of an
19 object reference hierarchy and a data dependence hierarchy, and the further
20 instructions are operable for adding temporal flow information from at least
21 one of a second group of a control flow hierarchy, an invocation hierarchy, an
22 allocation hierarchy, and an object creation hierarchy.

23 27. The apparatus of claim 26, wherein the OCH comprises one of a textual,
24 graphical and aural representation of the first group.

25 28. The apparatus of claim 26, wherein the presentation instructions are
26 operable for opening a scrollable window responsive to user action for
27 displaying said portion of the annotated OCH, and displaying a related portion
28 of source code of the program in a second window.

1 29. The apparatus of claim 25, wherein said tool is one of a group of profiler,
2 debugger, and quality analyzer, and the second instructions are further
3 operable for determining the TFH for the first portion of the program.